

WHAT IS CLAIMED IS:

1. A method of predicting the performance of a drilling system, comprising:

generating a geology model of a given
5 formation, the geology model including a geology characteristic of the given formation per unit depth; and

determining a predicted drilling performance for a proposed drilling equipment based on the
10 geology model and specification data of the proposed drilling equipment, wherein the specification data of the proposed drilling equipment is a function of the geology characteristic.

15 2. The method of Claim 1, further comprising:

determining a predicted drilling performance for a second proposed drilling equipment based on the geology model and specification data of the second proposed drilling equipment, wherein the
20 specification data of the second proposed drilling equipment is a function of the geology characteristic;

comparing the predicted drilling performance for the proposed drilling equipment to the predicted
25 drilling performance for the second proposed drilling equipment; and

based on the comparison, automatically selecting a recommended drilling equipment for use in the drilling system.

3. The method of Claim 2, further comprising limiting the predicted drilling performance for the proposed drilling equipment and for the second proposed drilling equipment to a certain depth in
5 the given formation.

4. The method of Claim 3, further comprising optimizing the drilling system such that the recommended drilling equipment is matched for use
10 with the drilling system at the certain depth in the given formation.

5. The method of Claim 2, further comprising displaying the recommended drilling equipment for
15 the drilling system in the given formation at the certain depth.

6. The method of Claim 5, wherein displaying further comprises outputting the recommended
20 drilling equipment in a preference order based on the comparison.

7. The method of Claim 1, wherein the geology characteristic is selected from a group consisting
25 of log data, lithology, porosity, confined rock strength, unconfined rock strength, and shale plasticity.

8. The method of Claim 1, wherein the
specification data includes at least one predicted
drilling mechanics data selected from a group
consisting of bit wear, mechanical efficiency, power
5 and operating parameters.

9. The method of Claim 1, wherein the
specification data includes a 3-D bit model.

10. A program product for predicting the performance of drilling system, the program product comprising:

a computer-usable medium; and

5 computer instructions encoded in the computer-usable medium, wherein the computer instructions, when executed, cause a computer to perform operations comprising:

generating a geology model of a given
10 formation, the geology model including a geology characteristic of the given formation per unit depth; and

determining a predicted drilling performance for a proposed drilling equipment based on the
15 geology model and specification data of the proposed drilling equipment, wherein the specification data of the proposed drilling equipment is a function of the geology characteristic.

20 11. The program product of Claim 10, wherein the computer instructions further comprising:

determining a predicted drilling performance for a second proposed drilling equipment based on the geology model and specification data of the
25 second proposed drilling equipment, wherein the specification data of the second proposed drilling equipment is a function of the geology characteristic;

comparing the predicted drilling performance
30 for the proposed drilling equipment to the predicted

drilling performance for the second proposed
drilling equipment; and

based on the comparison, automatically
selecting a recommended drilling equipment for use
5 in the drilling system.

12. The program product of Claim 11, wherein
the computer instructions further comprising
limiting the predicted drilling performance for the
10 proposed drilling equipment and for the second
proposed drilling equipment to a certain depth in
the given formation.

13. The program product of Claim 12, wherein
15 the computer instructions further comprising
optimizing the drilling system such that the
recommended drilling equipment is matched for use
with the drilling system at the certain depth in the
given formation.

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14. The program product of Claim 11, wherein
the computer instructions further comprising
displaying the recommended drilling equipment for
the drilling system in the given formation at the
25 certain depth.

15. A method of selecting drilling equipment for use in a drilling system comprising:

modeling a potential well bore based at least one geological characteristic; and

5 predicting a performance of a first drilling equipment of the drilling system to be used in drilling the potential well bore based on a predicted drilling mechanics data of the first drilling equipment, wherein the predicted drilling
10 mechanics data is a function of the at least one geological characteristic used in modeling the potential well bore.

16. The method of Claim 15, further
15 comprising:

predicting a performance of a second drilling equipment of the drilling system based on a predicted drilling mechanics data of the second drilling equipment;

20 comparing the performance of the first drilling equipment to the performance of the second drilling equipment; and

based on the comparison, selecting a preferred drilling equipment for use with the drilling system.

17. The method of Claim 16, further comprising:

comparing real time data obtained during the drilling of the potential well bore to the predicted
5 drilling mechanics data; and

modifying the predicted drilling mechanics data based on the real time data.

18. The method of Claim 16, further comprising
10 displaying the preferred drilling equipment for the drilling system.

19. The method of Claim 15, wherein modeling further comprises creating a geological model of a
15 potential well bore at a given depth.

20. The method of Claim 19, further comprising optimizing a drilling system based on the geological model such that the preferred drilling equipment is
20 recommended for use based on the given depth.

21. The method of Claim 20, further comprising displaying the optimized drilling system such that the preferred drilling equipment is displayed at the
25 given depth.

22. The method of Claim 15, wherein the geology characteristic is selected from a group consisting of log data, lithology, porosity, confined rock strength, unconfined rock strength,
5 and shale plasticity.

23. The method of Claim 15, wherein the predicted drilling mechanics data is selected from a group consisting of bit wear, mechanical efficiency
10 power and operating parameters.

24. The method of Claim 15, wherein the predicted drilling mechanics data comprises a 3-D bit model.

25. A program product for selecting drilling equipment for use in a drilling system, the program product comprising:

a computer-usable medium; and

5 computer instructions encoded in the computer-usable medium, wherein the computer instructions, when executed, cause a computer system to perform operations comprising:

10 modeling a potential well bore based at least one geological characteristic; and

predicting a performance of a first drilling equipment of the drilling system to be used in drilling the potential well bore based on a predicted drilling mechanics data of the first
15 drilling equipment, wherein the predicted drilling mechanics data is a function of the at least one geological characteristic used in modeling the potential well bore.

26. The program product of Claim 25, wherein the computer instructions perform operations further comprising:

5 predicting a performance of a second drilling equipment of the drilling system based on a predicted drilling mechanics data of the second drilling equipment;

10 comparing the performance of the first drilling equipment to the performance of the second drilling equipment; and

based on the comparison, selecting a preferred drilling equipment for use with the drilling system.

27. The program product of Claim 25, wherein 15 the computer instructions perform operations further comprising:

comparing real time data obtained during the drilling of the potential well bore to the predicted drilling mechanics data; and

20 modifying the predicted drilling mechanics data based on the real time data.

28. The program product of Claim 25, wherein 25 the computer instructions perform operations further comprising displaying the preferred drilling equipment for the drilling system.

29. The program product of Claim 25, wherein the computer instructions perform operations wherein modeling further comprising creating a geological model of a potential well bore at a given depth.

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30. The program product of Claim 29, wherein the computer instructions perform operations further comprising optimizing a drilling system based on the geological model such that the preferred drilling
10 equipment is recommended for use based on the given depth.

31. The program product of Claim 30, wherein the computer instructions perform operations further
15 comprising displaying the optimized drilling system such that the preferred drilling equipment is displayed at the given depth.

32. The program product of Claim 25, wherein
20 the computer instructions perform operations wherein the geology characteristic is selected from a group consisting of log data, lithology, porosity, confined rock strength, unconfined rock strength, and shale plasticity.

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33. The program product of Claim 25, wherein the computer instructions perform operations wherein the predicted drilling mechanics data is selected from a group consisting of bit wear, mechanical
30 efficiency power and operating parameters.

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34. A system for selecting drilling equipment
for use in a drilling system comprising:

a geological model of a proposed well bore, the
geological model representative of the proposed well
5 bore based on at least one geological
characteristic;

specification data of a plurality of proposed
drilling equipment, the specification data of each
proposed drilling equipment including a predicted
10 drilling mechanics data as a function of the at
least one geological characteristic used for the
geological model; and

means for comparing the predicted drilling
mechanics data for the proposed drilling equipment
15 to the geological model such that an optimized
drilling system is selected.

35. The system of Claim 34, further comprising
means for displaying the optimized drilling system.
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36. The system of Claim 35, wherein the means
for displaying comprises a computer display.

37. The system of Claim 35, wherein the means
25 for displaying comprises a printed output.

38. The system of Claim 34, wherein the
predicted drilling mechanics data is selected from a
group consisting of bit wear, mechanical efficiency
30 power and operating parameters.

39. The method of Claim 34, wherein the
geology characteristic is selected from a group
consisting of log data, lithology, porosity,
5 confined rock strength, unconfined rock strength,
and shale plasticity.